PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Reissue Application No.:	Not Yet Assigned	Patent No.	5,952,983
Filed:	August 6, 2001	Granted:	September 14, 1999
Patentee:	Dearnley et al.	Atty. Dckt No.:	47176-00434USPR
Title:	HIGH ISOLATION DUAL POLARIZED ANTENNA SYSTEM USING DIPOLE RADIATING ELEMENTS		

PRELIMINARY AMENDMENT "A"
TO REISSUE APPLICATION

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as Express Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. on the date indicated below:

8/16/2001 Corinne L. Roempagel
Date Corinne L. Roempagel

Commissioner For Patents
Washington, D.C. 20231

Dear Commissioner:

Please enter the following amendments before examination of the above-referenced reissue patent application:

In the Claims

Please add claims 30-37 as follows:

30. (New) An antenna comprising:

a ground plane;

a plurality of antenna components, each component comprising orthogonal, linearly polarized radiating structures electromagnetically coupled to said ground plane and producing electromagnetic fields upon receipt of electromagnetic signals, the individual electromagnetic

fields of said antenna components undesirably interacting with each other to impair the overall performance of the antenna;

at least one independent, electrically conductive parasitic element electrically unconnected to any of said antenna components, said electromagnetic fields produced by said antenna components inducing currents in said parasitic element; and

said at least one parasitic element being constructed, and being arranged relative to said antenna components, such that said currents induced in said at least one parasitic element by said electromagnetic fields reduce said undesirable interaction between said electromagnetic fields of said antenna components.

31. (New) The antenna of claim 30 wherein said radiating elements comprise first and second co-located, orthogonal dipoles, said dipoles aligned at first and second predetermined angles with respect to a vertical axis defined by said ground plane.

32. (New) The antenna of claim 31 wherein said first predetermined angle is substantially equal to +45 degrees with respect to said vertical axis and said second predetermined angle is substantially equal to -45 degrees with respect to said vertical axis.

33. (New) The antenna of claim 31 and further including at least one non-conductive support, said support connected to said ground plane and perpendicular to said vertical axis and placed between selected ones of said plurality of dipole radiating elements for supporting said at least one parasitic element.

34. (New) A method of providing an antenna having improved isolation, said method comprising:

providing a ground plane;

providing a plurality of antenna components, each component comprising orthogonal, linearly polarized radiating structures electromagnetically coupled to said ground plane and producing electromagnetic fields upon receipt of electromagnetic signals, the individual

electromagnetic fields of said antenna components undesirably interacting with each other to impair the overall performance of the antenna;

providing at least one independent, electrically conductive parasitic element electrically unconnected to any of said antenna components, said electromagnetic fields produced by said antenna components inducing currents in said parasitic element; and

said at least one parasitic element being constructed, and being arranged relative to said antenna components, such that said currents induced in said at least one parasitic element by said electromagnetic fields reduce said undesirable interaction between said electromagnetic fields of said antenna components.

35. (New) The method of claim 34 wherein providing said radiating elements comprise first and second co-located, orthogonal dipoles, said dipoles aligned at first and second predetermined angles with respect to a vertical axis defined by said ground plane.

36. (New) The method of claim 35 wherein said first predetermined angle is substantially equal to +45 degrees with respect to said vertical axis and said second predetermined angle is substantially equal to -45 degrees with respect to said vertical axis.

37. (New) The method of claim 35 and further including providing at least one non-conductive support, said at least one support connected to said ground plane and perpendicular to said vertical axis and placed between selected ones of said plurality of dipole radiating elements for supporting said at least one parasitic element.

REMARKS

Please enter the above amendmendments prior to a first action on the merits. Attached hereto is a clean copy of the pending claims after entry of the present amendment captioned "**Pending Claims After Entry of Amendment "A" to the Reissue Application**."

The amount of $304.00 is included in the check for reissue application filing fees to cover the fee for additional claims. The Commissioner is authorized to deduct any additional fees

required (except for payment of the issue fee) from or to credit any overpayment to Jenkens & Gilchrist, P.C. Deposit Account No. 10-0447, Order No. 47176-00434.

Respectfully submitted,

August 6, 2001
Date

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Attorney Docket No. 47176-00434

PENDING CLAIMS AFTER ENTRY OF
AMENDMENT "A" TO THE REISSUE APPLICATION

1. An antenna for simultaneously receiving separate electromagnetic signals comprising:

a ground plane with a length and having a vertical axis along said length;

a plurality of dipole radiating elements, said radiating elements comprised of first and second co-located, orthogonal dipoles, said dipoles aligned at first and second predetermined angles with respect to said vertical axis, said radiating elements and ground plane producing first electromagnetic fields in response to said electromagnetic signals;

a plurality of non-conductive supports, said supports connected to said ground plane and perpendicular to said vertical axis and placed between selected of said plurality of dipole radiating elements;

a plurality of independant metallic parasitic elements unconnected to said dipoles and placed in a selected of said plurality of supports, said first electromagnetic fields exciting currents in said metallic parasitic elements, said currents creating second electromagnetic fields, said second electromagnetic fields canceling with portions of said first electromagnetic fields.

2. The antenna of claim 1 whereby said first predetermined angle is substantially equal to +45 degrees with respect to said vertical axis and said second predetermined angle is substantially equal to -45 degrees with respect to said vertical axis.

3. The antenna of claim 1 wherein said parasitic elements are composed of aluminum.

4. The antenna of claim 1 wherein said support comprises an upper surface and said parasitic elements are positioned along said upper surface of said support.

5. The antenna of claim 1 wherein said plurality of supports is located midway between said radiating elements.

6. The antenna of claim 1 wherein said ground plane is composed of metal.

7. The antenna of claim 1 wherein said plurality of radiating elements includes exactly four radiating elements.

8. The antenna of claim 7 wherein said plurality of supports includes exactly two supports.

9. The antenna of claim 1 wherein said radiating elements transmit electromagnetic signals.

10. An antenna for simultaneously receiving separate electromagnetic signals comprising:

a ground plane with a length, said ground plane having a vertical axis along said length;

a plurality of radiating elements, said radiating elements comprised of first and second co-located, orthogonal dipoles, said first dipoles aligned at substantially a +45 degree angle with respect to said vertical axis, said second dipoles aligned at substantially a -45 degree angle with respect to said vertical axis, said radiating elements and ground plane producing a first electromagnetic field;

a plurality of non-conductive supports connected to said ground plane, said supports perpendicular to said vertical axis and placed between selected of said plurality of dipole radiating elements;

a plurality of independant metallic parasitic elements unconnected to said dipoles and placed in a selected of said plurality of supports, said first electromagnetic fields exciting currents in said metallic parasitic elements, said currents creating second electromagnetic fields, said second electromagnetic fields canceling with portions of said first electromagnetic fields; and

diversity reception means coupled to said plurality of radiating elements for selecting between said plurality of electrical signals.

11. The antenna of claim 10 wherein said parasitic elements are composed of aluminum.

12. The antenna of claim 10 wherein said parasitic elements are positioned along an upper surface of said supports.

13. The antenna of claim 10 wherein said plurality of supports is located midway between said antennas.

14. The antenna of claim 10 wherein said ground plane is composed of metal.

15. The antenna of claim 10 wherein said plurality of radiating elements includes exactly four radiating elements.

16. A method for providing high isolation for an array of radiating elements comprising the steps of:

simultaneously receiving separate electromagnetic signals;

providing a ground plane having a vertical axis;

providing a plurality of dipole radiating elements, said radiating elements comprised of first and second co-located, orthogonal dipoles, said dipoles aligned at a predetermined angle with respect to said vertical axis, said radiating elements having a top surface;

producing first electromagnetic fields in said radiating elements responsive to said electromagnetic signals;

providing a plurality of non-conductive supports, and placing said supports perpendicular to said vertical axis and between selected of said plurality of dipole radiating elements;

providing a plurality of independant metallic parasitic elements unconnected to said dipoles and placed in a selected of said plurality of supports;

exciting currents in said metallic parasitic elements;

creating second electromagnetic fields radiating from said parasitic elements; and

canceling with portions of said first electromagnetic fields with said second electromagnetic fields.

17. The method of claim 16 comprising the further step of placing said parasitic elements midway between the top surfaces of said radiating elements and said ground plane.

18. The method of claim 16 comprising the further step of orienting the radiating elements at a predetermined angle with respect to the vertical axis of the array.

19. An antenna for simultaneously receiving separate electromagnetic signals comprising:

a ground plane with a length and having a vertical axis along said length;

a plurality of dipole radiating elements, said radiating elements comprised of first and second co-located, orthogonal dipoles, said dipoles aligned at first and second predetermined angles with respect to said vertical axis, said radiating elements producing first electromagnetic fields in response to said electromagnetic signals;

a plurality of non-conductive supports, said supports connected to said ground plane and parallel to said vertical axis and placed adjacent selected of said plurality of dipole radiating elements;

a plurality of independant metallic parasitic elements unconnected to said dipoles and placed in a selected of said plurality of supports, said first electromagnetic fields exciting currents in said metallic parasitic elements, said currents creating second electromagnetic fields, said second electromagnetic fields canceling with portions of said first electromagnetic fields.

20. The antenna of claim 19 whereby said first predetermined angle is substantially equal to +45 degrees with respect to said vertical axis and said second predetermined angle is substantially equal to -45 degrees with respect to said vertical axis.

21. The antenna of claim 19 wherein said parasitic elements are composed of aluminum.

22. The antenna of claim 19 wherein said supports comprises an upper surface and said parasitic elements are positioned along an upper surface of said support.

23. The antenna of claim 19 wherein said plurality of supports is located adjacent to said radiating elements.

24. The antenna of claim 19 wherein said ground plane is composed of metal.

25. The antenna of claim 19 wherein said plurality of radiating elements includes exactly three radiating elements.

26. The antenna of claim 25 wherein said plurality of supports includes exactly two sets of supports.

27. A method for providing high isolation for an array of radiating elements comprising the steps of:

simultaneously receiving separate electromagnetic signals;

providing a ground plane having a vertical axis;

providing a plurality of dipole radiating elements, said radiating elements comprised of first and second co-located, orthogonal dipoles, said dipoles aligned at a predetermined angle with respect to said vertical axis, said radiating elements having a top surface;

producing first electromagnetic fields in said radiating elements elements responsive to said electromagnetic signals;

providing a plurality of non-conductive supports, and placing said supports parallel to said vertical axis and adjacent selected of said plurality of dipole radiating elements;

providing a plurality of independant metallic parasitic elements unconnected to said dipoles and placed in a selected of said plurality of supports,

exciting currents in said metallic parasitic elements;

creating second electromagnetic fields radiating from said parasitic elements; and

canceling with portions of said first electromagnetic fields with said second electromagnetic fields.

28. The method of claim 27 comprising the further step of placing said parasitic elements midway between the top surface of said radiating element and ground plane of selected of said housings.

29. The method of claim 27 comprising the further step of orienting the radiating elements at a predetermined angle with respect to the vertical axis of the array.

30. (New) An antenna comprising:

a ground plane;

a plurality of antenna components, each component comprising orthogonal, linearly polarized radiating structures electromagnetically coupled to said ground plane and producing electromagnetic fields upon receipt of electromagnetic signals, the individual electromagnetic fields of said antenna components undesirably interacting with each other to impair the overall performance of the antenna;

at least one independent, electrically conductive parasitic element electrically unconnected to any of said antenna components, said electromagnetic fields produced by said antenna components inducing currents in said parasitic element; and

said at least one parasitic element being constructed, and being arranged relative to said antenna components, such that said currents induced in said at least one parasitic element by said electromagnetic fields reduce said undesirable interaction between said electromagnetic fields of said antenna components.

31. (New) The antenna of claim 30 wherein said radiating elements comprise first and second co-located, orthogonal dipoles, said dipoles aligned at first and second predetermined angles with respect to a vertical axis defined by said ground plane.

32. (New) The antenna of claim 31 wherein said first predetermined angle is substantially equal to +45 degrees with respect to said vertical axis and said second predetermined angle is substantially equal to -45 degrees with respect to said vertical axis.

33. (New) The antenna of claim 31 and further including at least one non-conductive support, said support connected to said ground plane and perpendicular to said vertical axis and placed between selected ones of said plurality of dipole radiating elements for supporting said at least one parasitic element.

34. (New) A method of providing an antenna having improved isolation, said method comprising:

providing a ground plane;

providing a plurality of antenna components, each component comprising orthogonal, linearly polarized radiating structures electromagnetically coupled to said ground plane and producing electromagnetic fields upon receipt of electromagnetic signals, the individual electromagnetic fields of said antenna components undesirably interacting with each other to impair the overall performance of the antenna;

providing at least one independent, electrically conductive parasitic element electrically unconnected to any of said antenna components, said electromagnetic fields produced by said antenna components inducing currents in said parasitic element; and

said at least one parasitic element being constructed, and being arranged relative to said antenna components, such that said currents induced in said at least one parasitic element by said electromagnetic fields reduce said undesirable interaction between said electromagnetic fields of said antenna components.

35. (New) The method of claim 34 wherein providing said radiating elements comprise first and second co-located, orthogonal dipoles, said dipoles aligned at first and second predetermined angles with respect to a vertical axis defined by said ground plane.

36. (New) The method of claim 35 wherein said first predetermined angle is substantially equal to +45 degrees with respect to said vertical axis and said second predetermined angle is substantially equal to -45 degrees with respect to said vertical axis.

37. (New) The method of claim 35 and further including providing at least one non-conductive support, said at least one support connected to said ground plane and perpendicular to said vertical axis and placed between selected ones of said plurality of dipole radiating elements for supporting said at least one parasitic element.